

Methodology for Calculation of Scattering Parameters in a Transmission-Line Transducer

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Abstract

Transmission-line transducers are used for the measurement of absorption and reflection of different materials, such as: liquids, granular medium, and ground. A simplified methodology for calculation of scattering parameters of such transducers is presented. The transducer cell is partitioned at each interface and the partial scattering equations are calculated, considering two interfaces at a time. Next, standard techniques are applied to solve the signal-flow diagrams to obtain the full scattering equations. The proposed methodology has been applied to a coaxial transducer cell filled with different low-loss liquids. The results have been confirmed with computer simulations and experimental measurements. Measurements and simulations were carried out in the 300 kHz to 3 GHz frequency range.

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Figures used in the abstract

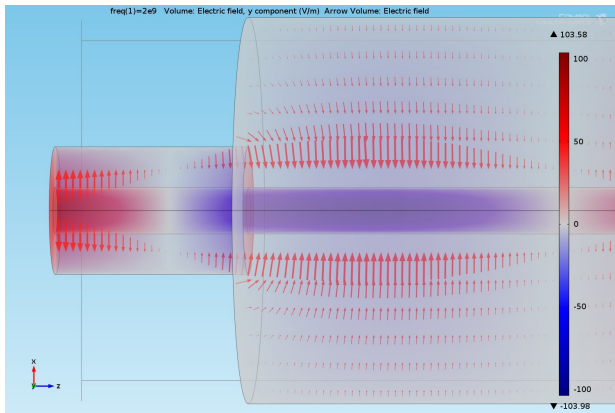


Figure 1